

**Wildland Fire Guidelines
For Archaeologists on the
Kaibab National Forest**

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Executive Summary

Archaeology is a major resource issue when there is a fire, whether it is a Wildfire, Wildland Fire Use or a prescribed burn. During fires, the Kaibab National Forest often requests archaeologists from other forests and regions to assist with fires on the Kaibab. This document is designed to be a resource for the Kaibab Fire Program and visiting archaeologists to guide them regarding the Kaibab fire protocols, safety protocol for working with heavy equipment, acceptable approaches to preserving sensitive heritage resources, post suppression rehabilitation, and data recording and management standards. Also included are examples of site recordation and report forms, guidelines for identifying artifacts, a Memorandum of Understanding regarding Wildfire Use fires and the R3 Amended Programmatic Agreement with the Arizona State Historic Preservation Officer, and Burned Area Emergency Response (BAER) Information.

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Introduction

Archaeology is a major resource issue when there is a fire, whether it is a Wildfire, Wildland Fire Use or a prescribed burn. During fires, the Kaibab National Forest often requests archaeologists from other forests and regions to assist with fires on the Kaibab. This document is designed to be a resource for the Kaibab Fire Program and visiting archaeologists to guide them regarding the Kaibab fire protocols, safety protocol for working with heavy equipment, acceptable approaches to preserving sensitive heritage resources, post suppression rehabilitation, and data recording and management standards. Included are also sources of information such as contact lists for the Kaibab archaeologists, dispatch and district offices, maps and other pertinent resources. Lastly, there is also information and resources for conducting Burn Area Emergency Response (BAER) analysis.

Much of the following was liberally borrowed from the Bureau of Land Management Field Guide for BLM Archaeologists Assigned to Wildfires (Horn and Winthrop 2005), and from documents used for a Wildland Fire Arch workshop created by the staff on the Coconino National Forest. Other sources included the Incident Response Pocket Guide (IRPG), the Fire Line Handbook and the expertise of experienced, fire qualified archaeologists.

Legal Consideration

36 CFR Part 800-Protection of Historic Properties does apply to all proposed wildland fire activities such as prescribed burns and fuels treatment in Wildland Urban Interface areas (see Appendix?). Section 12 of Part 800 applies specifically to emergency situations. Section 12(a) states that:

The agency official, in consultation with the appropriate SHPOs/THPOs, affected Indian tribes and Native Hawaiian organizations, and the Council, is encouraged to develop procedures for taking historic properties into account during operations which respond to a disaster or emergency declared by the President, tribal government, or the Governor of a State or which respond to other immediate threats to life of property. If approved by the Council, the procedures shall govern the agency's historic preservation responsibilities during any disaster or emergency in lieu of §§800.3 through 800.6

The Kaibab addressed Wildland Fire Use fires by developing an MOU (Appendix?) with the SHPO to enumerate the strategy for evaluating heritage resources and providing input to Wildland Fire Implementation Plans. Finally, when applied to Wildfires, Section 12(d) states that:

(t)his section in the regulations on emergencies only applies to undertakings that will be implemented within 30 days after the disaster or emergency has been *formally declared* by the appropriate authority. An agency may request an extension of the period of applicability from the Council(Advisory Council on Historic Preservation) prior to the expiration of the 30 days. *Immediate rescue and salvage operations conducted to preserve life or property are exempt* from the provisions of section 106 (of the National Historic Preservation Act) and this part.

As a rule, during a wildfire, the SHPO and the Tribes, especially if there are significant cultural values at risk, should be notified by the archaeologist and/or tribal liaison. Subsequent reports to the SHPO and/or tribes are for information only, unless there are recommendations for site eligibility concurrence which should be submitted to SHPO. To view all laws associated with Heritage resources management and consultation protocols see the Forest Service Manual Section 2300, Chapter 2360- Heritage Resource Management.

Ordering Archaeologists

As a general rule, there should always be an archaeologist assigned to any type of fire whether it's a Wildfire, Wildland Fire Use or a prescribed burn. However it is most critical to order archaeologists when ordering heavy equipment to a fire. Ideally, there would be one archaeologist for each piece of heavy equipment ordered. Realistically, because there is a shortage of fire qualified archaeologists, it may take longer to identify the archaeologist and, depending on the size of the fire, there may not be enough archaeologists to cover all of the heavy equipment. See Appropriate Management Response (AMR) for guidelines on how to proceed with limited archaeologists.

It is preferable to order fire qualified archaeologist with Southwestern archaeology experience. However, again due to the shortage of fire qualified archaeologist, it may be necessary to order archaeologists from other cultural areas of the United States. If that is the case, it is critical that these archaeologists are given a general orientation regarding the culture history and cultural material of the Southwest by a locally experienced archaeologist before assigning them a task on the fire.

Reporting to a Fire on the Kaibab

All archaeologists, upon arriving to a fire, should follow the standard ICS procedures as outlined below. However, keep in mind that the person (s) that archaeologists are required to report to may vary depending on the size and types of the fire.

- ◆ As a general rule archaeologist should check in immediately with Status/Check-in Recorder, or Planning Section Chief
- ◆ Get handheld programmable radios cloned in communications, or check out a handheld radio, with current incident frequencies; check frequencies daily as they change

- ◆ Get current Incident Action Plan (IAP) and map (check with the Planning Section)
- ◆ Set up your tent in the best available spot, preferably away from lights, generators and port-a-potties
- ◆ Obtain necessary equipment and supplies such as batteries, two days of food (MREs), water, tools, flagging etc

Archaeologists should also check in with their Supervisor for the assignment. Their supervisor will be either the Lead Archaeologist, the Resource Advisor, or the Planning Section Chief. On the fire line, the supervisor will also be the dozer boss and/or Division Supervisor. If you are the first archaeologist on the fire, contact the Kaibab Forest Archaeologist, South Zone or North Zone Archaeologist (see Appendix A for a list of contact information), to request access to the heritage files and other relevant information.

Roles and Responsibilities:

Lead Archaeologist

Whether it is a small fire with one or two archaeologists or a large fire with a full archaeology crew, one archaeologist should be identified as the “lead” archaeologist. That person is responsible for ordering archaeologists, coordinating the fire efforts, managing the data and working with the resource advisors, the planning team and the Incident Commander (IC). It is preferable that the lead archaeologist is an archaeologist from the Kaibab NF. However, in the event that a Kaibab archaeologist is not available, the first archaeologist on the fire should assume the role. If the fire grows and more archaeologists are ordered, the role can be transferred, if desired, to either a Kaibab archaeologist or another qualified archaeologist willing to assume the role. As a general rule, the lead archaeologist should operate out of the base camp and should not be assigned to the fire line.

| The Lead Archaeologist has the responsibility to:

- ◆ Work to minimize safety risks to fire archaeologist by emphasizing the Standard Firefighting Orders, Watch Out Situations, and insure that fire crews are aware of safety issues unique to the local environment or fire.
- ◆ Work within the establish chain of command to coordinate with the Incident Commander through the appropriate Section Chief (typically the Planning Section [Working with the planning personnel is one of the most important roles an archaeologist can play in the protection of heritage resources on a fire]).
- ◆ Find a color of flagging not being used on the fire and designate that color for arch sites (As a rule, hot pink is the standard color used by forests in Region 3) Communicate the information to the fire fighters and the Planning Section and insure that the archaeologist have an adequate supply
- ◆ Establish and maintain appropriate coordination with the Resource Advisor, if one had been assigned

- ◆ Order archaeologists as needed and maintain a functioning and safe archaeology crew
- ◆ Conduct an archaeological records search and collect any other relevant historical and cultural data
- ◆ Attend all briefings and planning meetings
- ◆ Coordinate with the necessary personnel to develop strategies for identifying and the protection of heritage resources
- ◆ Maintain and manage all archaeological data including site and survey records, maps GPS and GIS coverages and shape files in either digital and hard copy formats (see Data Management) and maintain confidentiality of such data
- ◆ Provide input to Operations regarding archaeology staffing needs for shifts. (This should be done through planning section, but it doesn't hurt to discuss with operations, especially Division Supervisors and dozer bosses)
- ◆ Liaise with the local heritage staff (READ) on a regular basis if a local heritage staff member is not assigned to the fire
- ◆ Prepare a technical document summarizing the status of the heritage properties analysis and/or recommendations regarding future management of site affected by the suppression activities (see Data Management)
- ◆ Prepare transition to BAER team
- ◆ Many of the responsibilities of the Lead Archaeologist are recurring. Therefore the Lead Archaeologist should ensure that they or another member of the team are insuring that the following is accomplished through out the length of the fire:
 - ❖ Insure Time is getting recorded and turned into the time keepers daily
 - ❖ Properly brief field crews; make sure they possess current Incident Action Plan and are integrated with Incident Operations for every shift. Ensure that the briefing is understood by each member of your field team
 - ❖ Check red-card qualifications of incoming archaeologists
 - ❖ Field crews have radios with current frequencies
 - ❖ All field personnel have hand tools in addition to full PPE
 - ❖ Operations planned for the Heritage team are safe
 - ❖ Debrief field crews daily and brief on assignments for next shift
 - ❖ Collect and store all field documentation
 - ❖ Organize and complete appropriate cultural resources documentation
 - ❖ Make cultural resources documentation available for: Suppression Rehabilitation, BAER/ESR, and the local unit Heritage staff
 - ❖ Complete demobilization for each Team member

Archaeologists

Minimally, archaeologist on the fire should meet the standards listed in the FSM-2360 and have a valid red card. Since there are no set training procedures for archaeologist in the ICS system, all archaeologist on the fire line should have completed basic wildland fire training (ICS-100, S-180, S-130, and S-190), and have an arduous work capacity rating. Archaeologists with a moderate or light work capacity rating will have completed basic wildland fire training and can be “escorted” to the fire line by person with an arduous rating and will follow the Red Book Chapter 6, page 6-12 for visits to the

fireline, but they will never be allowed to work alone on the fireline. Archaeologists with a moderate or light work capacity rating, however, can participate in the AMR rehab work, conducted after the fire is contained or in areas that are cold, and during the BAER analysis phase with out being “escorted.”

Archaeologists have the responsibility to:

- ◆ Get daily briefing from Lead Archaeologist including:
 - ❖ Location of assignment
 - ❖ Type of data/information required
 - ❖ Priorities
 - ❖ Time limits for completion
 - ❖ Method of transportation and safest route to get to assignment
 - ❖ Appropriate background documentation such as maps and site records for the area assigned
- ◆ Identify appropriate Division Supervisor for each assignment and check in with that individual to present planned activities in terms of personnel and location
- ◆ Identify and check in with the appropriate dozer boss and/or heavy equipment operator and swampers and discuss planned activities and safety procedures (see Bulldozer Safety)
- ◆ Conduct a radio check at the beginning of each shift on location with the Division Supervisor and the heavy equipment operator if appropriate; respect priority of emergency radio traffic
- ◆ Perform archaeological duties including, but not limited to the following:
 - ❖ Maintain Situational Awareness and observe all Standard Safety Procedures when working on the fire line and with heavy equipment
 - ❖ Inspect fire lines and other areas disturbed by incident operations and/or areas planned for ground disturbing operations, to locate cultural resources and determine effects related to the incident
 - ❖ Record cultural resources utilizing appropriate site record forms provided in Appendix D. Monitor previously recorded archaeological sites to determine and document effects, if any, related to the incident.
 - ❖ Collection of artifacts is not encouraged in general. However if it is deemed that a diagnostic artifact is in danger of being lost or destroyed, collections should only be made in consultation with the Heritage Program Manager or a Zone Archaeologists. (also see “**Collections**” below)
 - ❖ Work with Division Supervisor(s) and fire crews to protect cultural resources from AMR related impacts.
 - ❖ Maintain field notes (i.e. vegetation, topography, hydrology, cultural resources suppression related damage, etc.)
 - ❖ Report information and observations to the Lead Archaeologist daily.

Appropriate Management Response

As a general rule an archaeologist should be assigned to each piece of heavy equipment to help guide the equipment around archaeological sites and should be available to advise fire crews on how to best protect fire-sensitive sites within the projected path of the fire. Archaeologists should also conduct pedestrian surveys of all locations such as safety zones and staging areas where new ground disturbance is likely to occur. However, it is not always possible for archaeologists to cover all of these areas during the AMR efforts.

In situations where there are more activities than archaeologists to cover them, the Lead and field archaeologists should devise a strategy which would prioritize high site density areas as the primary focus during the AMR with the remaining area being addressed when staff become available and/or prior to the rehab.

Archaeologists are also responsible for identifying previously recorded sites, collecting data on newly discovered sites located within or near areas of ground disturbance. Also for assessing the potential impacts to the sites and recommending protection measures if warranted.

Survey

Safety is always the primary concern, especially if archaeologists are working on indirect fire line or in the green ahead or flanking the flaming front as a single resource. If you do not feel comfortable with a particular assignment make that known to your supervisor. Never compromise your safety for an archaeological site. Safety measures should include:

- ◆ Carrying a radio, programmed to the correct frequencies and conduct a radio check to ensure the radio is functioning properly. Carry a clamshell with backup batteries with you at all times. You should always have a fresh, unused set of 9 batteries for B/K programmable handheld radios in your line gear
- ◆ Ensuring that archaeology crew supervisors and the appropriate supervisors know the location of archaeologists working on the fire. Let appropriate supervisors know (via radio communication) when you come on their Division, where and how long you expect to be working, and when you leave their Division. This is critical as Division Supervisors are responsible for all resources on their Division and should disengagement from the fireline need to occur, the Division Supervisor will need to contact you directly to account for acknowledgement of the order
- ◆ Arranging transportation to and from the survey area
- ◆ Knowing and using the 10 and 18's and LCES and basing all tactical, on-ground decisions on appropriate hazard assessment
- ◆ Establish or know where the closest escape routes and safety zones are located at all times. Time yourself to know how long it will take you to get to a Safety Zone.
- ◆ Make sure others know that there are archaeologists in the area and what they are doing, especially if they are working around heavy equipment. Work closely with the dozer boss as they survey the line.

- ◆ Carry a hand tool (shovel, combination tool, etc.) at all times – this is required for fireline duty. If you have to deploy their fire shelter, you will use the tool to clear the flammable material from their deployment site

The archaeologists should select a distinctive color/pattern/combination of flagging (as a rule, hot pink is the color used on Forests in R3) and provide this information to Planning, who will insert the information into the Incident Action Plan. Once selected, this flagging must be used consistently by field crews. It may be advantageous to write on the flagging using a permanent marker – use field numbers or other non-descript identifiers (rather than “extremely important archaeological site 100 meters that way”). This will help firefighters if there is any confusion about what the flagging is. “Flag sites for a Blind Person”– use it copiously; make sure what your flag is easily identifiable. Dozer operators have trouble seeing out of the cab as the work is in dusty, smokey conditions. Let the dozer boss and/or Dozer Operator know what your flagging color scheme is.

Flag site boundaries and leave the flagging in place until AMR rehab is completed. Remember, suppression rehab may involve a bulldozer passing along the fire line to restore soil contours. If possible, try to give a 15-30 meter buffer around the boundary of the site.

The archaeologist should develop a numbering system for sites so that numbers can be assigned in the field and encoded into GPS.

Implement standard survey and documentation procedures to the extent possible:

- ◆ Document survey coverage using GPS, Mobil units, or on maps as you go
- ◆ Identify previously recorded site locations and record new sites using the sample form located in Appendix D
- ◆ Flag sites for protection along dozer lines and access roads
- ◆ Photograph and record disturbance to sites from suppression activities using the sample form in Appendix D
- ◆ Turn in all documentation to the lead arch daily

Documenting sites

It may not be possible to document sites to normal standards during a fire (see Appendix D for site form example). At a minimum, site documentation should include:

- ❖ Site identifier/ site number
- ❖ UTM/ GPS data point (CONUS NAD 83)
- ❖ Artifacts/ features present (brief description)
- ❖ Date, name of recorders
- ❖ Photograph
- ❖ Presence/ absence of damage from fire suppression
- ❖ Description of damage from fire, if present
- ❖ Site dimensions

Additional data such as creating a site map or taking additional photos of diagnostic artifacts can be gathered, if warranted, prior to the suppression rehab. Site maps can be created by using a GPS to map all of the features if there is enough distance between the features for them to be able to be distinguished when projected in GIS. Otherwise, site maps should be hand drawn.

Collections

Artifacts should not be collected. However in the event that a diagnostic (diagnostic lithic artifacts such as projectile points are not considered threatened by normal fire activities), rare, or fire sensitive artifact, is threatened and can not be relocated to a safe place near by, they can be collected (but only after consulting with the Kaibab Forest Archaeologist or the Lead Archaeologist, if the Kaibab Forest Archaeologist is not available to consult with in a timely manor). All collected materials should be placed into labeled bags and handed over the Lead Archaeologist along with the daily documentation.

Human remains or funerary objects

In the event that prehistoric human remains and/or associated funerary objects are discovered on the fireline, archaeologists will take all measures practical and necessary to minimize impacts to the area. Such measures will include marking the area for avoidance from ground disturbing activities with flagging and informing the dozer boss and/or Division Supervisor (in person rather than on the radio) that there is a highly sensitive heritage resource that is marked and needs to be avoided. Any activity within the site boundary will be avoided if possible, and no prehistoric human remains and/or associated funerary objects shall be collected or removed from their immediate vicinity. Any necessary operations conducted within the site boundary should be conducted using Minimum Impact Management Techniques (MIMT). Archaeologists will coordinate the implementation of site protection measures, such as blacklining, wet-lining, foam lining, or construction of handline with the dozer boss and/or Division Supervisor, if needed, and archaeologists should work with the fire staff to move the AMR activities away from the area. Firefighters should avoid directly applying fire retardant or foam to human remains.

At the end of each shift, the Lead Archaeologist must be notified of any discoveries of human remains to ensure ongoing protection of the site throughout the incident, post-fire monitoring, and protection during post-fire rehabilitation. The Lead Archaeologist must promptly notify the Forest Tribal Liaison of the discovery to ensure culturally affiliated tribes are consulted on a timely basis.

All human remains will be treated with appropriate respect. Disrespectful or inappropriate treatment of human remains will not be tolerated and is cause for dismissal from the incident.

Human remains and Native American Crews

Due to cultural or religious reasons, Native American personnel working on the fireline may express concerns about exposure to human remains or archaeological sites. These concerns should be respected and accommodated to whatever extent possible.

Bulldozer Safety

As noted above the role of an archaeologist working with a bulldozer or any other heavy equipment is to try to identify and avoid impacting any heritage resources that might be in the path of the disturbance. Archaeologists should work closely with the dozer boss and/or swamper as they survey the lines and make sure the dozer boss and/or swamper know where the Archaeologist is located at all times and do the following;

- ◆ Route heavy equipment around sites when possible, but the dozer boss has the final say as the person responsible for the safety of the equipment and operator. Let the dozer boss and/or Dozer Operator know what your flagging scheme is and what it means before engagement on the fire.
- ◆ Get a briefing on what the tactical directives and parameters of dozer line are. This will allow you to get further and further out in front of dozer operations in some instances. For example, if you know the dozer line is going direct you can assume that is what is going to happen and can survey that route out well in advance. If the dozer line is going indirect you may want to work closer to the dozer. Maintain your situational awareness, communications with the dozer boss and know where your escape routes and safety zones are AT ALL TIMES. If there is any doubt stop what you are doing and get a briefing from the dozer boss or nearby overhead.
- ◆ Establish hand signals or other communication methods with the operator before beginning work
- ◆ Stay in radio contact with the dozer boss and/or swamper
- ◆ Never ride on a dozer or get on or off moving equipment
- ◆ Never approach a dozer without ensuring the operator sees you first. Make sure he/she sees you seeing him/her and approach only after he/she signals you to do so. Dozer Operators are extremely aware of falling and flying debris. If you need to get the attention of the Dozer Operator, in an emergency, try throwing a stick or branch either over the blade or in between the cab and the blade. But be sure to maintain a safe distance from the dozer.
- ◆ Stay at least 100 feet ahead of or 50 feet behind equipment.
- ◆ Watch for falling trees. Stay 2 ½ times the height of the tallest trees away. More is better
- ◆ Stay visible, tie bright flagging to your tool. Think of what the operator can see. Can he/she see you?
- ◆ For night operations have a strobe light attached to your pack, or at least a glow stick and headlamp
- ◆ Never stand or work down slope from a working dozer
- ◆ Wear ear and eye protection and hardhat around equipment

- ◆ Don't get tunnel vision surveying ahead of dozers, stop and look around from time to time. "Look up, look down, look around"

As a general rule because of safety concerns the Kaibab does not encourage archaeologists to work with heavy equipment at night. If a fire breaks late in the afternoon or early evening, an archaeologist should be assigned to the following day shift. Or during a fire, the archaeologist should brief the night shift dozer boss or operator at the end of the shift regarding any archaeological concerns. Then conduct a survey of the line that was constructed during the night operations at the beginning of the next day shift, if time allows, or when there is staff available or prior to the suppression rehab.

Finally, because there is often a shortage of archaeologists, there may be occasions when there is more heavy equipment than archaeologists available to cover them. In those cases, it is necessary for the Lead and field archaeologists to devise a strategy that prioritizes areas of high heritage sensitivity as locations that will get immediate attention from the archaeologists; leaving the low sensitivity areas to be assessed when staff is available or prior to the suppression rehab.

Site Protection Methods

The following is a general list of site protection measures that can be implemented, but is in no way an exhaustive list.

Protection Measures

There are many actions that will help protect cultural resources from the effects of fire. Heritage specialists should work with fire specialists to implement these measures. The amount of protection afforded to heritage resources during an incident will depend in part on prior planning, readiness, and on the factors at play during an incident, including availability of resources and safety considerations.

Suggestions for protecting heritage resources include the following:

- ◆ Identify and flag for avoidance vulnerable heritage resources during AMR actions such as dozer-line construction
- ◆ Manually reduce fuels on and/or around vulnerable sites; pile debris offsite
- ◆ Create fire breaks near/around sites. This may be an effective way to protect rock art panels, for example
- ◆ Use retardant or foam to protect structures when necessary. NEVER use retardant or foam on rock art. (See note on these materials below)
- ◆ Wrap structures in fire proof materials to protect from fire
- ◆ Remove logs/heavy fuels from vulnerable sites/features (e.g. clear snags off bedrock mortars), or cover with foam or retardant prior to burn

- ◆ Flush cut and cover stumps with dirt, foam, or retardant, where burnout could affect subsurface cultural resources
- ◆ Identify and reduce hazard trees next to historic structures
- ◆ Saturate ground/grass adjacent to vulnerable structures with water, foam, or gel before burning
- ◆ Burnout around vulnerable sites
- ◆ Wrap carved trees, dendroglyphs, and other such features in fire retardant fabric
- ◆ Limb carved trees to reduce ladder fuels
- ◆ Cover rock art in fire resistant fabric
- ◆ Minimize fuels and smoke near rock art
- ◆ Cover fuels near rock art with foam, water, or retardant, avoiding the rock art

For a good discussion of protection measures for historic structures, see Matz (2002).

Fire Retardant/ Chemical Products

Application of fire retardant and other chemical products has the potential to affect heritage resources, although use of fire retardants on historic structures may protect them from destruction during a fire. Heritage resource specialists may need to consider the effects of fire itself versus the effects of retardant use or the possibility of other protection options during a fire. See these references for further information: Saleen 2004, Corbeil 2002, and the USDA Wildland Fire Chemical Systems website. This website has brief descriptions of the types of chemicals used and their potential effects on structures.

| There are various types of products:

- ◆ Long-term retardants, which contain salts (fertilizers) with additives that may color covered items red or which may turn metals bluish
- ◆ Foam fire suppressants, which are detergents and surfactants (wetting agents)
- ◆ Water enhancers which increase the effectiveness of water

| There are various potential effects from use of retardants, foams, and water:

- ◆ Rapid cooling: dumps of any of these materials on hot surfaces may cause effects to archaeological materials (e.g. artifact fracture) from rapid temperature change
- ◆ Materials dumped onto fragile archaeological features may break/ displace them
- ◆ Long-term retardants contain salts which can be desiccants, which damage old, fragile wood and may cause spalling in sandstone
- ◆ Chemicals may cause corrosion in metals
- ◆ Iron oxide additives may leave a permanent red stain and corrosion inhibitors in the retardant may turn surfaces, especially metals, blue or black

- ◆ Foams may hasten rusting on metal surfaces by removing protective coatings and may cause wood to flake due to swelling and contracting
- ◆ Water enhancers are desiccants and may damage wood surfaces, strip surfaces of finishes, and damage sandstone; they are also difficult to remove from wood surfaces, especially for old or fragile wood

Retardant should be washed off important structures as soon as possible. Pre-soaking, then hand-brushing with water and a mild detergent may work for sandstone or painted wood. Metals and glass may be wiped with water and a mild detergent. Power washing, sand-blasting, and acid based washes may damage historic materials.

Specific Site Protection Measures

Pictograph Sites

The Kaibab has a large concentration of pictograph sites, the majority of which are located within the Kanab Creek Wilderness (KCW) and along drainages on the Tusayan and Williams District. The Forest has currently designated KCW as unsuitable for wildland fire use due to heritage resource sensitivities. However, this does not preclude a wildfire from occurring in the wilderness.

Pictograph sites such as Snake Gulch Canyon (KCW), for example, are particularly vulnerable to potential adverse effects caused by wildfire due to a current infestation of noxious weeds as well as tall grasses in the canyon bottom. Likely effects to these and other pictograph sites would include smoke damage (sooting) and possible radiant heat damage to the pigments and rock surfaces.

Petroglyph panels would be subject to similar effects. Suggested treatments include removing vegetation in front of the panels to limit radiant heat exposure and smoke damage. If feasible, fire retardant fabric can also be used to protect the panels. However, treatment options within wilderness areas, such as the KCW, must comply with wilderness management guidelines and are generally limited to hand treatments. Any retardant use should take into account potential effects to the rock art.

Limestone Pueblos

The Kaibab has a high density of pueblos and small field houses that were constructed of limestone. Many of these sites are located in the pinyon-juniper zones of the forest. Post fire inspections of wildfires during the past two decades have demonstrated that high intensity wind driven fires in pinyon-juniper zones may damage these sites. Limestone is very porous and will spall and crack under extreme temperatures generally associated with high intensity fire activity. This effect is magnified under high fuel loading conditions such as situations where dead woody debris is concentrated atop a structural

feature or when standing trees or stumps are totally consumed including subsurface root systems. This "burn out" can cause rapid collapse of structures and features.

Pre-fire treatment of these sites, if time permits, can reduce adverse effects to the sites. This includes removing limbs and woody debris from atop the features as well as cutting dead trees and foaming over the stumps to prevent burn out. These techniques should only be used when safe to do so, and are more likely to be feasible during a wildland fire use situation or a prescribed burn rather than a wildfire.

While it may not be possible to minimize adverse fire effects to these sites during a wildfire, post fire treatment/rehabilitation efforts at sites that have suffered stand replacement fire can be beneficial. This includes removing trees atop structures to the stump, hand seeding, and in situations of high erosion, mulching and using downed trees to deflect and disperse water to limit sediment erosion. Post fire tree tip-ups are most common with larger conifers killed by fire. In contrast, post fire monitoring within burned pinyon-juniper has indicated that falling limbs and branches and subsequent fuel loading are common. Therefore, removing dead trees as part of post fire rehabilitation efforts can aid in the protection of sites during future wildfires.

Fire Lookout Trees

The Kaibab has several fire lookout trees that remain. These sites are listed on the National Register of Historic Places. Though found elsewhere, fire look out trees are not common throughout the Forest Service. In the early years of the Forest Service these lookout trees served as high points allowing forest rangers to locate fires. They generally include wooden ladders attached to a tall old growth ponderosa pine or Douglas fir tree, terminating with a small platform (though in some places only the ladders remain on the trees). Placing fire line around the tree and removing debris and ladder fuels, combined with wrapping the lower portion of the tree with fire retardant fabric or foam can be used to protect the tree and the associated wooden ladders.

Data Management

The Kaibab NF, along with most National Forests, relies heavily on a data base system called INFRA to track heritage records and on the use of mobile units to record archaeological sites. It is recognized that not all archaeologists assigned to a fire on the Kaibab will have the experience or knowledge to work with this type of program or equipment, but it is critical that whoever manages the data collected by the field archaeologist has enough knowledge of these systems to successfully download and store the digital data and paper files.

Setting up Office Procedures

Keep paperwork and records in order. Some things to keep in mind:

- ◆ Document survey coverages on master maps at the end of each period. This may be a paper and pencil exercise or, if the incident has the capability, it may be done through a GIS, though it may be advisable to print hard copies of the GIS coverages frequently, if not daily
- ◆ Collect field notes and organize them by date
- ◆ Collect film and photo logs, and send film for development
- ◆ Download digital images and collect image logs, store imagery on disks and drives.
- ◆ Collect site records and confirm assignment of temporary numbers
- ◆ Download and store GPS data, transfer to GIS if the incident has this capability
- ◆ Write daily narratives of work done; include developing issues and issues resolved, discussions with Incident Command staff and Resource Advisor, and decisions made concerning priorities and areas selected for surveys
- ◆ Maintain control over site atlas, site records and any sensitive cultural data relating to sacred sites and traditional cultural properties.

Records to Keep

- ◆ Personnel: name, arrival date, assignments, performance, demobilization (date), post incident contact information
- ◆ Site records and daily field notes.
- ◆ Survey Coverage Map: running record of areas surveyed annotated with date and surveyor name(s), plot locations of newly recorded sites.
- ◆ Documentation of effects: document situations of suppression and wildfire damage to cultural resources.
- ◆ Photo logs.
- ◆ Ordering information (copies of General Message Forms, requisitions, and receipts).
- ◆ Meeting and briefing notes.
- ◆ Every IAP.

Prepare a Report

The Lead Archaeologist will need to prepare a report. Use good professional judgment and defer to local standards; there is no set format. See Appendix F for an example of a report format. The report will be used by unit managers and the follow-up Burned Area Emergency Response (BAER) team, if one is assigned. Copies of the report should go to the Documentation Unit, the Plans Section Chief, the Agency Representative, the ES/R-BAER team leader. However, the reports that are filed with the Documentation Unit, the Plans Section Chief, the Agency Representative, the ES/R-BAER team leader should not include any information that would be considered confidential or sensitive to Native Americans (the Kaibab Tribal Liaison should be consulted regarding sensitive Native American information). However, the sensitive information may be given to the archaeologist assigned to the BAER Team. If there are adverse effects, the SHPO will also need a copy. The report should include:

- ◆ Areas surveyed (maps), with dimensions and acres
- ◆ Sites forms and maps showing site locations (this is confidential information which can be incorporated in the body of the report or placed in an appendix titled confidential)
- ◆ Areas surveyed before and after impacts
- ◆ Suggestions for suppression and BAER rehabilitation team
- ◆ Sites damaged from fire suppression activities, as noted
- ◆ Site protection actions taken (from suppression and/or fire effects)
- ◆ Consultation records

The report should be completed within 10 days of control of a wildfire (the date of completion of a report for a Wildfire Use fire or a proscribed burn should be negotiated with the Kaibab Forest Archaeologist). Try to keep some archaeologists on the fire to help until the report is complete.

Technical Specifications

GPS

Grid System: Universal Transverse Mercator (UTM)

Zone: 12N

Datum: Nad 83

Base Meridian: Gila/Salt River

GIS

Arcmap: version 9.2

Digital Camera

Pixals: 300

PDA's

Arcpad: version 9.2

Appropriate Management Response Rehabilitation

The majority of AMR rehab is conducted using heavy equipment to push soil into or “rip” the dozer-lines, though there are occasions where roads opened or safety zones will receive similar treatments. Therefore, it is desirable to conduct a pedestrian survey of all of the dozer-lines and any other locations that are likely to receive rehabilitation efforts at the end of the fire. The pedestrian surveys should identify any new or previously recorded sites and recommend actions that will limit additional damage due to the rehabilitation activities and soil erosion.

In general the best recommendation is to have the rehabilitation crew avoid conducting rehabilitation activities within the boundaries of a site. This can easily be done by flagging the site boundaries along the dozer-line using the flagging color already identified for heritage resources. Communicate to the rehab crew the locations of the

area to be avoided and instruct them to “walk” their equipment through the area with their blades up.

If the site is located in an area that is visible via a public road, rehabilitation of the site is desirable to protect it from off-roaders who may mistake the dozer-lines for roads or trails. In that case, a non-invasive rehabilitation method such as “vertical mulching,” which is the scattering of dead and/or down pine needles, leaves, branches etc, along the damaged area to visually disguise the disturbed area would be advisable.

If soil erosion is a concern, it is probably best to document the concern, recommend that the rehabilitation crews avoid impacting the site, then give the recommendations to the BAER team. If no BAER team is going to be assigned to the fire, recommend a non-invasive rehabilitation method and regular follow up monitoring of the site by the local archaeologists.

All recommendations should be documented using the EMERGENCY POST-FIRE SITE INSPECTION RECORD located in Appendix E.

Burned Area Emergency Rehabilitation

If a BAER Team is assigned to the fire, copies of all documentation and any recommendations should be given to the BAER Team archaeologist. Since BAER is a different action from fire suppression, refer to Appendix H for further information and recommendations.

Demobilization

It is imperative that before an archaeologist is “demobed” from a fire, they must do the following:

- ◆ Before the field Archaeologist “demobes” they must turn in all site records, copies of maps, photos, notes and any other relevant documentation to the Lead Archaeologist. Also delete all digital copies of site records, maps and any other confidential or sensitive information from GPSs, laptops, and Mobil units
- ◆ Before the Lead Archaeologist “demobes,” all digital data, paper records, photos and maps must be organized and reports should be completed and turned over to the local archaeologist and redacted copies of reports should also be turned into the Documentation Unit, Planning Unit and BAER Team.

References

Corbeil, Don
2002 After the Fire: Investigating Fire Suppression Impacts on Historic Resources.
PowerPoint presentation:

http://www.blm.gov/heritage/powerpoint/Fire_Corbeil/Impacts%20to%20Historic%20Resources_2_files/frame.htm

Horn, Steve and Kate Winthrop

2005 Bureau of Land Management Field Guide for BLM Archaeologists Assigned to Wildfires. On file at the Supervisory Office of the Kaibab National Forest.

Matz, Steve

2002 Historic Structure Protection during a Wildland Fire.

http://www.blm.gov/heritage/powerpoint/Matz_HistoricStructureProtection_files/frame.htm

Saleen, Merrill,

2004 Fire Chemicals and Cultural Resources. PowerPoint presentation:

http://www.blm.gov/heritage/powerpoint/ARCHEO~1_files/frame.htm

USDA Wildland Fire Chemical Systems

Links to information on wildland fire chemicals: <http://www.fs.fed.us/rm/fire/>

Wildland Fire Chemical Products: (Brief descriptions of chemicals used):

<http://www.fs.fed.us/rm/fire/documents/defin.pdf>

Wildland Fire Chemical Products Effects on Structures:

<http://www.fs.fed.us/rm/fire/retardants/current/gen/pdf/effstructure.pdf>

Winthrop, Kate

2004 Bare Bones Guide to Fire Effects on Cultural Resources for Cultural Resources Specialists:

<http://www.blm.gov/heritage/Fire%20Effects%20on%20Cultural%20Resources.htm>

Appendix A: Kaibab Contact List

Supervisor's office
800 S. 6th ST, Williams, Az 86046
Phone: (928) 635-8200
Fax: (928) 635-8208

Margaret Hangan
Forest Archaeologist
(928) 635-8342

Mike Lyndon
Tribal Liaison
(928) 635-88272

Williams Dispatch Center
800 S. 6th ST, Williams, Az 86046
(928) 635-2601

Mae Franklin
Navajo Tribal Liaison
(928) 679-2037

Williams Ranger District
742 S. Clover Road,
Williams, Az 86046
Phone: (928) 635-5600
Fax: (928) 635-5680

Neil Weintraub
South Zone Archaeologist for the
Williams and Tusayan Districts
(928) 635-5647

Erin Woodard
Assistant South Zone Archaeologist
(928) 635-5635

Tusayan Ranger District
Hwy 64/Administrative Site,
P.O. Box 3088, Grand Canyon, Az 86023
Phone: (928) 635-2443
Fax: (928) 635-8204

North Kaibab Ranger District
430 S. Main St
P.O. Box 248
Fredonia, AZ 86022
Phone: (928) 643-8100

Connie Reid
North Zone Archaeologist
(928) 643-8165

Britt Betensen
Assistant North Zone Archaeologist
(928) 643-8184

Appendix B: List of Fire Sensitive Site Types

This list is taken from the Appendix D: Attachment 2 of the First Amended Programmatic Agreement Regarding Historic Property Protection and Responsibilities Among New Mexico Historic Preservation Officer and Arizona State Historic Preservation Officer and Texas State Historic Preservation Officer and Oklahoma State Historic Preservation Officer and the Advisory Council on Historic Preservation and United States Department of Agriculture Forest Service Region 3 and the Wildlands Urban Interface Hazardous Fuels Reduction Protocol.

A review of available literature on the effects on fire on cultural resources and on the experience of FS heritage resource specialists and SHPO staff in the Southwestern Region indicates that there are two categories of fire-sensitive sites. The first consists of sites long-known to be vulnerable to the effects of even low-temperature fires and/or light fuel loads, such as sites that contain organic materials, exposed architecture, etc. The second group includes sites that have generally been considered to have less risk for fire effects in most situations, including prehistoric and historic sites with deeply buried cultural deposits; prehistoric and historic artifact scatters; and prehistoric and historic sites with non-flammable surface features. However, depending on field conditions—especially fuel loading—as well as specific site characteristics and expected fire behavior, these other site types may be fire-sensitive in certain WUI projects.

Known Fire-Sensitive Sites in the Southwestern Region:

- Historic sites with standing, or down wooden structures or other flammable features or artifacts
- Rock art sites
- Cliff dwellings
- Prehistoric sites with flammable architectural elements and other flammable features or artifacts
- Prehistoric sites with exposed building stone of soft or porous material such as volcanic tuff, or limestone
- Culturally modified trees, including aspen art and peeled/scarred trees
- Certain traditional cultural properties (based on consultation with tribes)

Other Project-Specific Fire-Sensitive Sites:

- Other sites, based on local field conditions and Forest-specific concerns
- Other sites, based on consultation with SHPO staff
- Other sites, based on consultation with fire management staff, fire behavior specialists or fire effects researchers

Appendix C: List of Properties Considered Eligible for Inclusion on the National Register of Historic Places

The following is from Appendix B of the First Amended Programmatic Agreement Regarding Historic Property Protection and Responsibilities Among New Mexico Historic Preservation Officer and Arizona State Historic Preservation Officer and Texas State Historic Preservation Officer and Oklahoma State Historic Preservation Officer and the Advisory Council on Historic Preservation and United States Department of Agriculture Forest Service Region 3

LIST OF PROPERTIES THAT MAY BE CONSIDERED ELIGIBLE

For eligibility determinations under the First Amended Programmatic, the following types of heritage resources, provided they are 50 years old or older and clearly retain integrity, may be considered eligible for the National Register of Historic Places under criterion (d) without further SHPO consultation or concurrence:

- Properties with clear evidence for the presence of structures (historic structures, pueblos, pithouses, teepee rings, etc.)
- Properties with hundreds of surface artifacts
- Properties with clearly visible evidence of buried cultural deposits
- Properties with rock art
- Properties that clearly meet the National Register listing requirements in State historic contexts, existing multiple-property contexts, or SHPO-approved Forest-level historic contexts

Other properties will be treated as if eligible, unless the FS chooses to make a determination of eligibility in consultation with the SHPO. The SHPO will monitor eligibility determinations and discuss any problems at the annual meeting.

Appendix D: Site Form Sample

WILDFIRE HERITAGE RESOURCE DESCRIPTION SHEET

FIRE NAME: _____

DATE: _____

PREPARED BY: _____

Temporary Site Number: _____

UTMs: E _____ /N _____ Datum _____

Site Type: _____

Site Description:

Impacts: _____

Photos Taken: Y/N

Temporary Site Number: _____

UTMs: E _____ /N _____ Datum _____

Site Type: _____

Site Description:

Impacts: _____

Photos Taken: Y/N

Appendix E: Emergency Post-Fire Inspection Record

EMERGENCY POST-FIRE SITE INSPECTION RECORD

SITE No: 03 – 07 - _____ - _____ **Temp or other No:** _____ **Date of Inspection:** _____
Inspector(s): _____

SITE DESCRIPTION

Site Type: Prehistoric _____ Historic _____ Multi component _____ Other _____
UTM (GPS) Z12 _____ **E** _____ **N** _____ **Elev:** _____ **USGS** _____
Quad: _____
Features Present: _____
List wood/organics (if known to be present): _____
Were they burned/consumed? Y _____ N _____

VANDALISM PRESENT: YES _____ NO _____ If yes, Recent YES _____ NO _____ UNKNOWN _____

SITE PERIMETER WALKED YES _____ NO _____

SITE BURN SEVERITY

_____ Low (duff partially consumed, none to little ladder fuels burned, no canopy burned)
_____ Moderate (duff consumed, ladder fuel burned, isolated crown burn or torching)
_____ Severe (duff, ladder and crown completely consumed)

Note: Map, photograph and describe affected areas of site

FIRE EFFECTS AT SITE

	YES	NO
Cracking/spalling.....	_____	_____
Smoke/soot damage.....	_____	_____
Stump/root holes.....	_____	_____
Loss of architectural wood/features.....	_____	_____
Fire-killed tree(s) on walls or rubble.....	_____	_____
Other _____		

SUPPRESSION IMPACTS TO SITE: YES _____ NO _____ **Handline** _____ **Drop point/safety zone** _____
Dozer line _____ **Retardant drop impact/staining** _____ **Mopup** _____ **Tree falling** _____ **Spike Camp** _____ **Safety** _____
Zone _____ **Vegetation removal** _____ **Vehicle ruts** _____
Other _____

EROSIONAL THREATS TO SITE : YES _____ NO _____

On site slope _____ % **Aspect** _____ °
Site Watershed (to 20 m. out) **Slope** _____ % **Aspect** _____ °
Active Erosion (gully/rilling/scouring present: Yes _____ No _____ **If yes, depth and extent:** _____
Potential for Erosion: Yes _____ No _____ **If yes, stump hole/burned log erosion** _____ **Pedestaling** _____
Duff absent _____ **Other** _____

RECOMMENDED PRESERVATION TREATMENT

_____ **No Treatment Recommended**
_____ **Monitor**
_____ **Treatment Recommended: if so, describe:** (e.g. Directional falling, Straw bale, straw scatter, Excelsior matting, sandbag, etc.) _____

Additional comments on back Yes _____ No _____
ADDITIONAL COMMENTS:

Appendix F: Technical Report Format

Technical Report Format

The following is a report format recommendation.

Abstract

Introduction

Project Description

Previous Survey

Previously Recorded Sites

Newly Recorded Sites

Damaged Sites

Site Rehabilitation Recommendations

National Register of Historic Places Eligibility Recommendations

Conclusions

All or some of the categories listed above should be used. New ones can be added if they are relevant to the analysis. Suppression and BAER reports should always be separate documents. The report style for all reports shall follow the SAA format and the Font shall be Times New Roman 12 pt. Photos and maps should be incorporated in the document or attached to the report as an appendix. Both digital and hard copies of all drafts and finals are to be submitted to the Kaibab Forest Archaeologist for review as should copies of all GPS data, GIS data and digital photos. The Forest Archaeologist will be responsible for conducting consultation with the AZSHPO and the Tribes if appropriate.

Suppression reports should be turned into the Kaibab Forest Archaeologist 10 days after a wildfire is declared controlled. However, a later date can be negotiated with the Forest Archaeologist. Due dates for BAER, proscribed burns and Wildfire Use fires will need to be negotiated with the Kaibab Forest Archaeologist.

Appendix G: Ceramic and Projectile Point Identification Guidelines

To Be Developed

Appendix H: Burned Area Emergency Response (BAER) Information

To Be Developed

Appendix I: R3 Amended Programmatic Agreement

PROGRAMMATIC AGREEMENT
AMONG
USDA FOREST SERVICE, SOUTHWESTERN REGION
AND
ARIZONA STATE HISTORIC PRESERVATION OFFICER
AND
NEW MEXICO STATE HISTORIC PRESERVATION OFFICER
AND
ADVISORY COUNCIL ON HISTORIC PRESERVATION
REGARDING
WILDLAND URBAN INTERFACE HAZARDOUS FUELS REDUCTION PROJECTS

WHEREAS, the USDA Forest Service and other federal land managing agencies are directed by Congress to implement an accelerated, multi-year program of hazardous fuels reduction as one component of the National Fire Plan; and

WHEREAS, the USDA Forest Service Southwestern Region (FS) is implementing such an accelerated program of hazardous fuels reduction in areas adjacent to the Wildland Urban Interface (WUI), described in Appendix E; and

WHEREAS, the Federal Fire Policy emphasizes that wildland fire is a critical natural process that must be reintroduced into the ecosystem; and

WHEREAS, current, unmanaged fuel loads in many areas support large, hot, uncontrolled, and devastating wildfires that destroy life and property, including historic properties; and

WHEREAS, mechanical treatments, such as thinning, in combination with prescribed fire will reduce fuel loading and stand density in areas adjacent to the Wildland Urban Interface so that wildfires approaching these areas will “go to the ground” where they can be effectively and safely suppressed; and

WHEREAS, hazardous fuels reduction treatments will also help protect historic properties from the devastating effects of catastrophic wildfires, including associated suppression activities and subsequent erosion, such as the fires experienced in the Southwest in the 2000 wildfire season; and

WHEREAS, although beneficial to historic properties over the long-term, various fuels reduction treatments are undertakings that have the potential to affect historic properties, particularly fire-sensitive sites (Appendix B), and steps should be taken to avoid or minimize those effects while accomplishing the objectives of the National Fire Plan; and

WHEREAS, the FS has consulted with the Arizona and New Mexico State Historic Preservation Officers (SHPOs) and the Advisory Council on Historic Preservation

(Council) pursuant to Section 800.14(b) of the regulations (36 CFR 800, published 12/12/01) implementing Section 106 of the National Historic Preservation Act (16 U.S.C. 470f); and

NOW, THEREFORE, the FS, the Council, and the SHPOs agree that the FS shall implement Wildland Urban Interface (WUI) projects in accordance with the following stipulations in order to satisfy responsibilities under Section 106 of the National Historic Preservation Act (NHPA).

STIPULATIONS

The FS shall ensure that the following stipulations are carried out:

1. **SCOPE.** This Agreement covers all hazardous fuels reduction activities within WUI areas, described in Appendix E, with the exception of stand-alone commercial timber sales. Activities covered by the Agreement include: hand thinning; mechanical thinning; use of equipment such as Hydro-ax, Agra-ax, and brush crushers, timber sales embedded in thinning contracts; slash disposal, including lopping and scattering, chipping, pile burning, and windrow or jackpot burning; broadcast burning; and fuelwood use, including free use, fuelwood permits, and commercial fuelwood sales undertaken as part of a WUI project.
2. **INTERNAL COORDINATION AND TRACKING.** The FS shall ensure that heritage specialists are brought into the planning for WUI projects as early as possible in the planning process, but no later than the identification stage, and that a system is in place to track implementation of heritage resource protection and monitoring requirements, and that necessary communication and coordination between fuels treatment specialists and heritage specialists will continue throughout the implementation of WUI projects carried out under this Agreement.
3. **TRIBAL CONSULTATION.** As early as possible in the planning process, but no later than the identification stage, the FS shall consult with American Indian tribes to determine if any properties of traditional cultural or religious importance are present within the WUI project's area of potential effect. If specific properties are identified, the FS shall consult with the appropriate tribes concerning evaluation, determination of effects, and protection measures. If agreement cannot be reached or if adverse effects cannot be avoided, the FS shall consult case-by-case with interested tribe(s) and the SHPO as provided for in Stipulation 13.
4. **PUBLIC INVOLVEMENT.** The FS shall use the NEPA scoping process and other means necessary to solicit input on heritage resource concerns and to identify consulting parties as required in 36 CFR 800.3(f).
5. **IDENTIFICATION.** The Forest Archaeologist shall determine or approve the level of field survey for each WUI project. If less than a 100% survey is proposed, the Forest

Archaeologist shall notify the appropriate SHPO of the proposed survey strategy and rationale, using the guidelines in Appendix A. The SHPO shall provide any comments within 10 working days of receipt of the notification. The Forest Archaeologist shall take the SHPO's comments into account in finalizing the survey strategy. The finalized survey strategy will be provided to the SHPO upon request. If no comments are received within the specified timeframe, the Forest Archaeologist may assume that the SHPO does not object to the submittal and may proceed with the identification strategy.

Alternatively, a Forest may opt to develop a Forest-wide survey strategy for WUI projects in consultation with the SHPO and thereby eliminate the need for individual project notifications. As experience is gained with WUI projects, the goal is to develop a Region-wide set of WUI survey guidelines which can be incorporated into Appendix A and used in lieu of case-by-case SHPO notification and review.

6. EVALUATION. The FS and the SHPOs agree that certain classes of properties (Appendix C) may be determined eligible for the National Register of Historic Places for Section 106 purposes based on survey information without further, case-by-case SHPO consultation. The eligibility of other properties may remain unevaluated but treated as if eligible, unless the FS chooses to consult with the SHPO on individual eligibility determinations or adverse effects cannot be avoided. The FS shall consult with the SHPO and appropriate tribes concerning the eligibility of any traditional cultural properties identified by the tribes that cannot be protected from project effects.

7. EFFECT. Following completion of the survey strategy approved by the Forest Archaeologist in accordance with Stipulation 5, the FS shall determine the effects of the WUI project on historic properties:

a) No Historic Properties Affected. If no properties are identified within the area of potential effect or if through application of the site protection measures in Appendix D potential effects have been excluded from all eligible and unevaluated properties, and provided that none of the conditions requiring case-by-case consultation specified in Stipulation 13 apply, a determination of "No Historic Properties Affected" will be made for the WUI project in accordance with 36 CFR 800.800.4(d)(1). For prescribed fires, this will include only those projects in which a 100% survey is conducted and all eligible and unevaluated properties will be protected. For other types of activities, if less than a 100% survey is conducted, the discussion of effects will include a rationale addressing the sufficiency of the level of effort.

b) No Adverse Effect. If properties are present but through application of the protection measures in Appendix D potential adverse effects on eligible and unevaluated properties have been minimized to the extent that they do not meet the criteria of Adverse Effect contained in 36 CFR 800.5(a)(1), and provided that none of the conditions requiring case-by-case consultation specified in Stipulation 13 apply, a finding of "No Adverse Effect" will be made for the WUI Project in accordance with 36 CFR 800.5(b). This shall include prescribed burns in which fire-sensitive properties will be protected.

c) Adverse Effect. If the Forest Archaeologist determines that a property(ies) may be adversely affected, or in the case of a prescribed fire, a fire-sensitive property cannot be adequately protected, the FS shall consult case by case on the WUI project under 36 CFR 800.6, as specified in Stipulation 13.

8. PROTECTION. The Forest Archaeologist shall draw from the protection measures in Appendix D to ensure that effects to historic properties (or fire-sensitive properties for prescribed fire undertakings) are avoided. Site protection requirements shall be documented in the inventory report (Stipulation 10) and on the FS Inventory Standards and Accounting (IS&A) form.

9. MONITORING. Terms and conditions of Section 106 compliance shall include appropriate post-project monitoring to assess effectiveness of protection measures in accordance with FSM 2361.28.5, including monitoring 20% of protected fire-sensitive sites in prescribed burn areas. In addition, each Forest will incorporate into the inventory report for at least one WUI project each year the requirement to monitor a minimum of 20% of sites not considered fire-sensitive within the burn area. For this monitoring, Forests will select WUI projects that offer good opportunities to assess the effects of prescribed fire on the types of sites not normally protected during burn implementation. Alternatively, the Forest Archaeologist may develop, in consultation with the SHPO, a different monitoring strategy for a WUI project or group of projects. The purpose of post-treatment monitoring is to gather data that will be used to improve planning for protection of heritage resources in future WUI projects. Forests are encouraged to monitor a sample of sites not considered fire-sensitive in more than one WUI project per year when feasible to expand available information on the effects of prescribed fire on historic properties. Site-specific monitoring requirements will be documented in the inventory report and on the IS&A form. Each Forest shall maintain an updated list of sites to be monitored which will include the date monitoring is planned, date completed, and monitoring results. This list and a summary of monitoring results will be included in the annual summary report to SHPOs and the Council (Stipulation 18).

10. INVENTORY REPORT. Inventory reports shall follow standard FS and SHPO reporting guidelines. For WUI projects, the FS shall also ensure that reports include: a description of all planned activities, equipment to be used, and expected impacts; a discussion of fuel loading and expected fire behavior if prescribed burns are planned; a detailed discussion and rationale for the survey strategy if less than 100%, including a rationale for what is considered “fire-sensitive” (Appendix A.2); a summary of the inspection of fire-sensitive sites and any other sites to be monitored, including site-specific fuel loading; site-specific protection measures, and site-specific monitoring requirements.

11. APPROVAL. When all of the above stipulations are complied with and the inventory report has been approved by the Forest Archaeologist, and provided that none of the conditions requiring case-by-case consultation specified in Stipulation 13 apply, the Forest Supervisor may approve the report and proceed with the undertaking, provided

all site-specific protection measures are implemented. The Forest Supervisor shall forward a copy of the report, IS&A form, and associated site forms to the SHPO within 30 days, unless otherwise agreed to with the SHPO.

12. SHPO AND COUNCIL REVIEW. The SHPOs will programmatically review results of work conducted under this agreement for discussion at the annual meeting (Stipulation 19). If, at any point, a SHPO identifies a concern about how the stipulations of this Agreement are being applied, the SHPO may submit comments to the FS for consideration in future projects. If a SHPO or the Council has a substantial concern that historic properties may be adversely affected in a specific WUI project, the SHPO or Council may contact the Forest Archaeologist or Forest Supervisor to resolve those concerns. If the concerns are raised prior to the NEPA decision, and are not resolved, the SHPO or the Council may request that the FS consult case-by-case as provided for in Stipulation 13. If the NEPA decision for the WUI project has already been made, the FS shall take into account the SHPO/Council comments for those actions not yet completed.

13. CASE-BY-CASE CONSULTATION. The FS shall consult separately under the Region 3 *Programmatic Agreement Regarding Cultural Property Protection and Responsibilities* or the Council's regulations for any WUI Project where:

- a. the FS chooses to consult case-by-case
- b. a substantial public concern exists about effects of the project on historic properties such that the expedited review procedures in this Agreement cannot ensure that those concerns will be adequately considered
- c. a disagreement exists with an Indian tribe concerning adverse effects on a property of traditional cultural or religious importance to the tribe
- d. the FS determines that it is likely that adverse effects to eligible or unevaluated sites cannot be avoided using the protection measures in Appendix D.
- e. a SHPO or the Council requests that the FS consult case-by-case based on a substantial concern that historic properties may be adversely affected, as provided for in Stipulation 12.

In case-by-case consultations for WUI projects, the definition of "Adverse Effect" and the consultation procedures to resolve adverse effects, 36 CFR 800.6, will be those contained in the current (12/12/00) regulations.

14. DISCOVERY SITUATIONS. There is some potential for encountering previously unrecorded properties or for affecting properties in an unanticipated manner during the course of hazardous fuels reduction treatments. Previously unrecorded properties that are encountered during the course of a WUI Project shall be protected in the same manner as other properties, using the protection measures in Appendix D. If the FS determines that a property has been damaged, the FS shall halt all activities that could result in further damage to the property and shall notify the appropriate SHPO concerning proposed actions to resolve adverse effects. The SHPO shall respond within 48 hours of notification. The FS shall carry out the agreed-upon actions.

15. PHASING FOR CRITICAL WUI PROJECTS. In recognition of the difficulties inherent in initial implementation of an accelerated hazardous fuels reduction program, it is agreed that in FY 2001 and FY 2002, a phased approach may be used to expedite WUI Projects that directly border communities and residential areas in order to protect life and property. A phased approach should be used only when it is not reasonably possible to complete Section 106 compliance for all aspects of the undertaking prior to reaching a NEPA decision. Where deemed necessary by the Forest Supervisor, consultation for such a project may be carried out in two phases: 1) Fuelbreak Area - the initial creation of fuelbreaks within ½ mile of communities and residential areas using mechanical treatments, usually followed by burning; and 2) Non-Fuelbreak Area – an adjacent area, usually treated in a subsequent year with broadcast burning or a combination of thinning and burning to reduce hazardous fuels leading up to the fuelbreaks. In this phased approach, a final NEPA decision on the WUI project may be made prior to completion of the identification and evaluation of properties in the Non-Fuelbreak Area provided that all of the following requirements are met:

- a. none of the conditions in Stipulations 13 apply to the WUI project
- b. the requirements in Stipulations 3-7 have been completed for the Fuelbreak Area
- c. the expected nature and distribution of properties in the Non-Fuelbreak Area and anticipated effects are discussed and considered in the inventory report and in the NEPA analysis;
- d. there is no reason to believe that the protection measures in Appendix D will not be sufficient to protect properties in the Non-Fuelbreak Area.
- e. a condition of the forest satisfying responsibilities under Section 106 for the WUI Project, clearly stated in the inventory report and on the IS&A Form, is that the identification and protection requirements of this Agreement, including the written approval of the Forest Archaeologist and Forest Supervisor, shall be completed prior to the award of any contract, permit, or other authorization for on-the-ground work in the Non-Fuelbreak Area.
- f. the NEPA decision document clearly states that initiation of work in the Non-Fuelbreak Area will be contingent upon completion of the identification and protection of historic properties and compliance with applicable provisions of NHPA in accordance with this Agreement.

If the FS subsequently determines that adverse effects on historic properties in the Non-Fuelbreak Area cannot be avoided, the FS shall consult with the SHPO and other consulting parties in accordance with the requirements of 36 CFR 800 and will amend its decision if necessary to disclose the effects.

16. DATA MANAGEMENT. The FS shall incorporate survey and site information gathered under this Agreement into its corporate tabular (INFRA) and spatial (GIS) data base for heritage resources and shall make these data available to the SHPOs or relevant state agencies for incorporation into State-wide databases. The FS will continue to work with the SHPOs to coordinate and expedite data sharing. When possible, GIS maps will be made available to the Fire Use Manager or Burn Boss for use in implementation of prescribed fires and in the event of an escaped fire.

17. SECRETARY'S STANDARDS. The FS shall ensure that work under this Agreement is carried out under the supervision of a person or persons meeting the Secretary of the Interior's Historic Preservation Professional Qualifications Standards.

18. ANNUAL SUMMARY REPORT. The FS shall document the combined results of work conducted under this Agreement in a separate part of the Region's Annual Report submitted to the SHPOs and the Council pursuant to the Southwestern Region's 1990 *Programmatic Agreement Regarding Cultural Property Protection and Responsibilities*. The report shall include Forest-specific summaries of the results of monitoring, including the effectiveness of the identification strategies and protection measures and any changes proposed to make these more effective. The report shall be submitted to the SHPOs and the Council prior to the annual meeting (Stipulation 19).

19. ANNUAL MEETING. Prior to March 1 of each year, as part of the annual meeting carried out pursuant to the Southwestern Region's 1990 *Programmatic Agreement Regarding Cultural Property Protection and Responsibilities*, the FS, the SHPOs, and the Council, if it chooses to participate, shall review the activities carried out pursuant to this Agreement, reevaluate its terms, and determine whether continuation, amendment, or termination is appropriate.

ADMINISTRATIVE STIPULATIONS

REVISION OF APPENDICES

Any signatory to this Agreement may request modifications to Appendices, without a formal amendment, whereupon the parties will consult to consider such change. Changes may be made by written consent of the Regional Forester, SHPOs, and Council after appropriate consultation.

AMENDMENTS

Any signatory to this Agreement may request that it be amended, whereupon the parties shall consult to consider the amendment.

TERMINATION

Any signatory to this Agreement may terminate it by providing thirty (30) days notice to the other parties. The signatories will consult during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. In the event of termination, the FS shall comply with the Region's 1990 *Programmatic Agreement Regarding Cultural Property Protection and Responsibilities* with regard to individual undertakings that otherwise would be covered by this Agreement.

Termination by an individual SHPO shall only terminate the application of the Agreement within the jurisdiction of that SHPO.

EXPIRATION

This Agreement is executed as of the last date shown below and expires in five years at which time it is subject to review, renewal, or expiration. If the FS wishes to extend the life of the Agreement past the five-year period, the FS will contact the SHPOs and Council at least ninety days prior to expiration with its recommendation to either amend the Agreement or extend its term without revision. Based on comments received from the SHPOs and Council, the FS will make any needed changes to the Agreement and circulate the new document for review and signature.

EXECUTION

Execution and implementation of this Agreement satisfies the Forest Service's Section 106 responsibilities for all WUI projects in the Arizona and New Mexico that are treated in conformance with the stipulations herein.

IMPLEMENTATION

This Agreement becomes effective on the date of the last signature below and will be implemented immediately.

/s/ JAMES T. GLADEN

7/12/01

Eleanor S. Towns, Regional Forester
USDA Forest Service – Southwestern Region

Date

/s/ JAMES W. GARRISON

7/16/01

James W. Garrison, State Historic Preservation Officer
State of Arizona

Date

/s/ ELMO BACA

7/13/01

Elmo Baca, State Historic Preservation Officer
State of New Mexico

Date

/s/ JOHN M. FOWLER

7/19/01

John M. Fowler, Executive Director
Advisory Council on Historic Preservation

Date

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Appendix J : Wildland Fire Use MOU with SHPO

**A Revised Strategy for Evaluating Heritage Resources and
Providing Input to Wildland Fire Implementation Plans**

Kaibab National Forest, Arizona

by
Neil S. Weintraub
South Kaibab Zone Archaeologist, Kaibab National Forest
And
John A Hanson
Kaibab National Forest Archaeologist
March 19, 2007

INTRODUCTION

This report proposes to renew the Memorandum of Understanding (MOU) between the Kaibab National Forests and Arizona State Historic Preservation Office regarding Section 106 consultation procedures for the Wildland Fire Use process (Arizona State Historic Preservation Office 2000). In proposing this renewal, Kaibab National Forest archaeologists have updated the report "A Strategy for Evaluating Heritage Resources and Providing Input to Wildland Fire Implementation Plan" (Hanson and Farnsworth 1999), to reflect their seven years of experience with the process. Wildland fire use implementation involves a staged process that involves making decisions within 8 hours (Stage 1), so the established process currently used for Agency compliance with Section 106 is inadequate to accommodate such a short time-frame. Following the requirements of the previous MOU, the Kaibab National Forest fuels specialists have removed hazardous fuels on tens of thousands of acres during the past seven years, thus reducing the threat of catastrophic wildland fire to hundreds of heritage resources. The previous Memorandum of Understanding (MOU) regarding Wildfire Use Implementation Procedures expired 12/31/2004. This report proposes that the MOU be renewed with minor revisions to the strategy plan for heritage resources that adhere to the latest Wildland Fire Use Implementation Procedures Reference Guide (2006) (Appendix 1).

FIRE EFFECTS ON HERITAGE RESOURCES

There is a great need for the Forest Service to implement Wildland Fire Use. Allowing Forests to burn under a natural, controlled process will lessen the likelihood of catastrophic fires in the future. It is the out of control, emergency catastrophic fires that pose the greatest danger to heritage resources. Wildland fire use can be an effective tool in reducing the threat of catastrophic wildfires, but it can also be used to reduce the fuels that have accumulated on and around all heritage resources.

A review of the existing research on fire effects to heritage resources concludes that the effects of fire on sites and artifacts are variable (Propper and Lissoway, 1988). There is general agreement in the literature that the nature and severity of damage to heritage resources by fire depends on three variables:

1. The fire intensity.
2. The duration of heat.
3. Heat penetration into the soil.

These three variables are directly related to the amount, size, and arrangement or distribution of fuels on a site, or the “fuel loading.” In order to employ wildland fire use to accomplish predetermined resource objectives, fire managers establish fire parameters or “prescriptions” that describe conditions (fuel types, fuel loading, relative humidity, temperatures, wind speed, etc.) under which a burn is conducted to produce the physical fire characteristics necessary to accomplish those objectives. Based on extensive experience, the prescriptions that have been used in Northern Arizona fuel types often produce fires with low to moderate intensities that move over the ground surface fairly quickly, so as to produce minimal heat penetration into the soil. Occasionally, in wildland use fires, a mosaic of high intensity burning is to be anticipated and even desirable in some instances. Following the strategies outlined below, however, significantly reduces the likelihood of adverse effects to heritage resources resulting from such burning.

HERITAGE RESOURCES RATIONALE AND INPUT PROCESS

During the past seven years, archaeologists on the Kaibab National Forest have successfully implemented wildland fire use adhering to the guidelines outlined in the original report (Hanson and Farnsworth 1999). During that period fire managers have treated thousands of acres while hundreds of archaeological sites have had fuels reduced on or around them, making all of those sites less vulnerable to effects from future wildfires (Hanson 2003, McNamee 2005, Lyndon 2005 and 2006, Reid 2003a and 2003b, Weintraub and McNamee 2004, Weintraub 2003, 2005a and 2005b). An admitted and unfortunate exception to this record occurred in 2006 during the Warm Fire on the North Kaibab Ranger District. Notably, however, the process discussed below was not strictly adhered to during this incident, which while extremely costly in terms of resource damage, is considered an aberration unlikely to be repeated.

As a result of the above accomplishments, we propose to continue to allow wildland use fires in prehistoric archaeological sites within prescriptions specified in the Wildland Fire Implementation Procedures Reference Guide (WFIP Guide 2006, see Appendix 1). Fire sensitive site types that occur on the Kaibab National Forest include rock art, rock shelters, cliff dwellings, and a variety of historic site types that contain wood. In addition, based on local fuel loading conditions, sites with limestone masonry may also be considered fire sensitive, as severe spalling may occur to these archaeological features. These site types would be identified during wildland fire use implementation from existing Forest site record data bases, and recommendations for protection measures, archaeological field inspections, additional inventory needs, and monitoring requirements provided to the planning process.

Protection measures for sensitive sites include but are not limited to: the exclusion of areas with high densities of sensitive sites, hand or dozer fire lines, use of existing roads or trails as lines, use of topographic features or geological features as natural barriers, foam lines, fire-proof wraps, or burning out to create a black line around the site. In the case of dozer constructed firelines, a para-archaeologist or an archaeologist will survey

the proposed line prior to construction, avoid sites, and submit the survey information to the Archaeologist for inclusion into a final report.

In the event that a wildland fire use is proposed for implementation in an area with little or no heritage information, two approaches may be taken. If heritage specialists have sufficient reason to believe the area contains high heritage concerns as outlined above, then suppression efforts should be taken. If there is uncertainty about the heritage concerns, a team of red-card archaeologists and fuels specialists will visit the project area in advance of fire spread, conduct reconnaissance inventories for fire-sensitive heritage sites and determine whether suppression efforts are really warranted (McNamee 2005 – Appendix 2).

TRIBAL INVOLVEMENT

The Kaibab National Forest has conducted consultations over the years on numerous prescribed burning projects, wilderness fire plans, forest restoration projects, and wildland fire use. Tribes consulted include the Hopi Tribe, the Navajo Nation, the Pueblo of Zuni, the Havasupai Tribe, the Hualapai Tribe, the Yavapai-Prescott Tribe, and the Kaibab Band of Paiute Indians. In summary, there is a recognition that fire is a natural component of most vegetation types in the Southwest, and as such plays an important role in the maintenance and perpetuation of vegetative diversity which may include plants important to traditional practices. Responses to various proposed actions for projects involving fire have indicated support for the reintroduction and carefully managed use of natural fire with appropriate protection measures for sensitive sites. It is recommended that in the case of implementing a wildland fire use, at the earliest appropriate stage of the WFIP, the appropriate Tribe(s) be notified if the fire is in an area known to be culturally sensitive or important to them, to determine if there are concerns with implementation or areas that need to be protected. The results of these consultations will be incorporated into the WFIP.

WILDLAND FIRE USE EXCLUSION AREAS

Snake Gulch and the Kanab Creek Wilderness have been identified as exclusion areas on the Kaibab National Forest because of the presence of high densities of sensitive rock art sites. The Forest will have the option to review exclusion areas, and modify, eliminate, or designate new ones on an annual basis for inclusion into the Fire Management Plan.

WILDLAND FIRE USE IMPLEMENTATION PROCEDURES

Wildland fire use is defined as the management of naturally ignited wildland fires to accomplish specific pre-determined resource management objectives in defined geographic areas. Wildland fire use implementation will occur according to provisions contained in the Forest Land Management Plans and Fire Management Plan. Forest Land Management Plans form the foundation for wildland fire use programs. These plans contain the basic information such as identification of land areas, levels of resource use and predicted outputs, and identification of suitable resource management practices.

Issues and opportunities are identified and acceptable alternatives are selected that address fire management needs for the areas covered by the plan.

The next tier in the process is the preparation of the Fire Management Plan, which is the primary tool for translating the programmatic direction contained in the Forest Land Management Plan into an on-the-ground strategy. The Fire Management Plan for the Kaibab National Forests will contain maps as appendices of any areas that heritage resource managers determine should be excluded from wildland fire use implementation because of heritage resources concerns. Concerns may include high concentrations of site types that are considered sensitive to fire such as rock art, rock shelters, cliff dwellings, historic sites containing wood (including logging railroad lines), limestone structures in areas of high fuel-loading or un-inventoried areas thought to have a high potential to contain sensitive sites.

The most detailed step in the process involves the implementation of the objectives and strategies for wildland fire use contained in the above plans. It is at this level where a specific plan, called a Wildland Fire Implementation Plan (WFIP), is prepared in response to a wildland fire start. The WFIP is initiated for all wildland fires and is a progressively developed plan (three distinct planning stages) that documents the analysis and selection of strategies and describes the appropriate response for a wildland fire that is being managed for resource benefits.(see Appendix 1). A full WFIP consists of three stages. Different levels of completion may occur for differing management strategies (i.e. fires managed for resources benefits will have two or three stages of the WFIP completed; while fires that receive a suppression response only have a portion of Stage 1 completed).

HERITAGE RESOURCES AND THE WFIP

Heritage resources input into wildland fire use occurs in all three stages of the WFIP (See Appendix 1, 2006 revised Wildland Fire Use Implementation Procedures Reference Guide). Stage 1 represents the initial fire assessment step, and results in a compilation of the basic information necessary to manage the fire. The Decision Criteria-Checklist provides the information on a set of standard evaluation criteria to determine if the wildland fire meets the criteria to be managed for resource benefits, the initial go/no go decision is the result of this stage. A review of existing site records will be made by heritage specialists to determine if known sites exist in the area of the fire. Sensitive sites and prehistoric sites will be identified. Initial fire assessment information such as the topography, fuel loading, fuel models, and forecast fire behavior will be considered in responding to the Decision Element in Stage 1 “Are potential effects on cultural and natural resources outside the range of acceptable effects?” In the event that a wildland fire use is proposed for implementation in an area with little or no heritage information, two approaches may be taken. If heritage specialists have sufficient reason to believe the area contains high heritage concerns as outlined above, then suppression efforts should be taken. If there is uncertainty about the heritage concerns, a team of red-card archaeologists and fuels specialists will visit the project area in advance of fire spread, conduct reconnaissance inventories for fire-sensitive heritage sites and determine whether

suppression efforts are really warranted (McNamee 2005 – Appendix 2). Heritage specialists will strive to provide as complete information as possible at the outset, and plan on refining that information if a fire progresses into stages 2 and 3 WFIP implementation, when more complete management information about the fire will be available.

Should Stage 1 result in a “go decision,” Stage 2 of the WFIP is completed to provide managers with information to initiate and continue short-term management of the wildland fire. A complexity analysis is conducted to determine the overall complexity of the fire. Cultural values are included as a weighted element in this analysis. This information can be extracted from information provided in the Stage 1 planning, and will be considered along with fire behavior predictions. Input will also be incorporated into short-term implementation actions in stage 2.

Stage 3 of the WFIP is completed to provide the full long-term implementation actions necessary to manage the wildland fire to accomplish identified objectives. It is here that the ultimate acceptable geographic size of the fire is defined, and long-term fire behavior predictions are made. Heritage resources objectives, constraints, and considerations will need to be reviewed, developed and detailed, and incorporated into this stage. At this stage, it is critical that archaeologists evaluate whether they have the resources available to manage a large Maximum Manageable Area.

Site discovery situations may occur in any of the three WFIP stages. The archaeologist will be notified of such situations, and recommend an appropriate course of action.

MONITORING STRATEGY

The original strategy (Hanson and Farnsworth 1999) did not make specific monitoring recommendations. After seven years of implementation, we believe that at the end of the fire, Archaeologists should monitor all fire sensitive sites where they took protection measures. In addition, archaeologists will monitor 20% of the sites not considered fire-sensitive (such as artifact scatters to ensure that they suffered no adverse effects).

REPORTING REQUIREMENTS

The original agreement required a 30-day reporting window after the end of a wildland fire use project. Given the potential increase in wildland fire use projects in coming years, we propose that rather than write individual reports for each fire, Archaeologists submit a report to the State Historic Preservation Officer at the end of each fiscal year. This report will document the specifics of all fire use projects, the heritage resources evaluation, recommendations, any inventory that may have occurred as a result of dozer line construction or fire management and heritage resources needs, and monitoring results.

CONCLUSION

The heritage resource evaluation process detailed above will result in no adverse effects to heritage resources through the implementation of wildland fire use. As stated in the Introduction of the Wildland Fire Use Implementation Procedures Guide, “Wildland fire will be used to protect, maintain and enhance resources, and, as nearly as is possible, be allowed to function in its natural ecological role.” (2006, page 2) When implemented successfully, wildland fire use reduces fuels on and around heritage resources thus helping prevent adverse effects from future potential catastrophic wildland fires. This report is submitted in compliance with the provisions of the Historic Preservation Act of 1966, as amended.

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Appendix K: North Kaibab Fire Procedures

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North Kaibab Ranger District On-District Archaeological Support to Fires

Overview

Archaeologists play a major role in Appropriate Management Response (AMR) activities in the Southwestern Region. While all sites can suffer impacts from the heat of a wildland fire, sites with intact features are particularly susceptible to damage from AMR activities. In an effort to minimize damages to archaeological sites as a result of initial attack, it has become common for archaeologists to be assigned to fires to help direct heavy machinery around sites during line construction, as well as to advise overhead personnel about the location and particular nature of sites within the fire area. When possible, measures can be taken to either actively protect a site, or minimize damage. Ground disturbance to sites resulting from suppression efforts can generally be avoided or minimized by directing heavy machinery and line construction activities around the site.

Each season, several members of the North Kaibab Heritage Program are red-carded to work as archaeologists on district fire assignments. Sites within the pinion-juniper and grassland zones of the district are particularly vulnerable to disturbance by heavy machinery. Many pueblo habitation ruins are found in these zones. Often these sites are highly visible and can be readily avoided simply by directing heavy machinery around the site. The same is true for historic sites such as old cabins, corrals, dumps, etc... Artifact scatters can be more problematic. In many locations on the district, particularly in the pine and fir zones, site boundaries may be fairly discreet. However, in the pinion-juniper and grassland zones, as well as on some open ridge systems and meadows, “cultural landscapes” extending across many acres may be encountered. In these instances, archaeologists should try to avoid artifact concentrations and features, but it may not be possible to completely avoid running a machine line through the site. Fortunately, in most instances damage is not extensive. A damage assessment can be prepared when the fire is contained.

Archaeologists can also participate as resource advisors and as field assistants helping minimize damage to other sites not necessarily susceptible to machinery. For example, brush can be pulled back from known rock art sites to limit spalling and blackening of the rock art, and firebreaks can be built around eligible historic structures in advance of the fire if time permits. Historic structures can also be “cloaked” with fire retardant materials in an effort to protect the structure and protected by sprinkler systems.

Following the containment of the fire, archaeologists may participate in completing fire line surveys of areas not inspected during the fire as well as recording new sites identified during the fire or post fire assessment phase. This will include preparing damage assessment for any sites damaged by suppression activities, and in some cases, conducting site stabilization for damaged sites.

North Zone Initial AMR Procedures 2008

Connie Reid, North Zone Archaeologist will assume general advisory responsibility for Heritage Resources on North Kaibab wildland fires. However, Britt Betenson, Assistant North Zone Archaeologist may also serve as the lead *Archaeologist-Technical Specialist* if available. Personnel assigned to a fire specifically to work as an archaeologist are officially titled *Technical Specialists*. Connie and/or Britt are responsible for working

with red-carded archaeologists/para-professionals assigned to the fire. All archaeologists or paras assigned to work on the fire line with dozers during initial attack and prior to full containment of the fire will be red-carded at the arduous fitness level. Connie or Britt may also serve as a *Resource Advisor* for a wildland fire that has lots of heritage sites. *Resource Advisors* are assigned by a District Ranger to represent all district resources that may be affected by the fire. An archaeologist is most likely to be assigned as *Resource Advisor* when heritage sites are the most threatened resource in a fire area (e.g. pinyon-juniper zone).

Arduous red-carded district field personnel (archaeologists and paras) will be assigned to district fires as *Technical Specialists* to direct machinery around sites. It is best for archaeologists and paras new to fire suppression to shadow an experienced person before working independently. Working with another seasoned archaeologist is preferable. However, some dozer bosses are very familiar with working with archaeologists and can also provide guidance. It is recommended that individuals operating as archaeological specialists on a fire have exposure to basic line fire fighting as well, so that they have actual field experience with fire situations.

In the event that heavy machinery is deemed necessary to contain a fire on the district, Williams Dispatch Center will call for a red-carded archaeologist. It is important for red-carded crewmembers to monitor their radio during working hours at the height of fire season and be particularly poised to respond if they hear that a dozer is being “staged” for use. It is acceptable for red-carded archaeologists to check in with Dispatch to indicate their general location of where they are going to be working and their availability to respond if the district is staging a dozer. However, often times, fire managers may stage a dozer then opt to not use it. Red-carded folks should continue to do their regular job until they hear from Dispatch (DO NOT RESPOND TO A FIRE UNLESS DISPATCH HAS OFFICIALLY DISPATCHED YOU). If the dozer is not needed, an archaeologist will generally not be requested. Exceptions to this may occur if the district is looking for an extra fire fighter due to a shortage on red-carded personnel. In those situations the archaeologist may be asked to participate as a crewmember. It is important during fire season to carry fire gear in the crew vehicle. If there is only one crew vehicle, someone may have to meet the archaeologist at a designated location or a crewmember may have to transport the individual. If an extra Heritage vehicle is available, the archaeologist should utilize that.

There may be instances where there are more dozers operating than arduous red carded archaeologists or paras. In that situation, areas of high heritage sensitivity will receive priority over areas of low sensitivity. Low sensitivity areas will be assessed when there is staff available or prior to the AMR rehab. As a general rule, fires occurring in the pinyon-juniper zones, pinyon-juniper/ponderosa pine transition zones have a higher sensitivity than the ponderosa pine or mixed conifer portions of the District. Shrub lands and canyon areas such as Snake Gulch and Kanab Creek also contain sensitive resources. There are some significant historic sites in the tall timber zones, such as historic cabins and lookouts. The District fire management staff is aware of these locations and will be working with District archaeologists to protect these sites.

Once Dispatched

Once you have been officially dispatched, you must report in full PPE with a RADIO and a HAND TOOL. Call dispatch on the radio and let them know that you can respond and find out who the IC (Incident Commander) is for the fire so you know who to contact when you arrive at the fire. When you leave to go to the fire call dispatch and let them know you are enroute and your estimated time of arrival. You may need to ask dispatch for the location of the fire (road junction) so that you know where to report. When you arrive at the fire, tie in with the IC. The IC will assign you to the dozer or the hand crew. Call dispatch and let them know you have arrived at the fire and with whom you are tying in with (you will most likely remain with the dozer or hand crew for the duration of the fire, however, if the situation changes let dispatch know your whereabouts). Instructions will be provided on where to meet the dozer operator/boss.

You will likely work with the dozer boss ahead of the dozer. If a dozer is used you will help survey a line for the dozer to create that avoids impacting sites. Often you will survey in front of the dozer while the dozer is moving behind you at a safe distance. Though not desirable, there are instances when a dozer boss is not present because the dozer operator is a dozer boss qualified or a dozer boss is simply not available. In any fire situation a person is responsible for his or her own safety but this is particularly critical when working as an archaeologist with no dozer boss. You must be on guard at all times. Work out a set of communication rules with the dozer operation first (i.e., hand signals for stop/go or that you will be crossing drainages so that the dozer must hold up until you safely reach the other side of the drainage). Make sure that the dozer operator can see you. Put bright flagging on your pack/hand tools, etc...

Safety (adapted from the KNF Fire Guidelines for Archaeologists)

Working with the Bulldozer:

As noted above, the role of an archaeologist working with a bulldozer or any other heavy equipment is to try to identify and avoid impacting any heritage resources that might be in the path of the equipment activity areas. Work closely with the dozer boss and/or swamper as he/she surveys the line and make sure they know where you are located at all times.

- ◆ Route equipment around sites when possible. However, as the person responsible for the safety of the equipment and operator, the dozer boss has the final say.
- ◆ Stay in radio contact with the dozer boss and/or swamper.
- ◆ Never ride on a dozer or get on or off moving equipment unless there is a life threatening emergency.
- ◆ Never approach a dozer without ensuring the operator sees you first. Make sure he/she sees you and approach only after he/she signals you to do so.
- ◆ Stay at least 100 feet ahead of or 50 feet behind equipment.

- ◆ Watch for falling trees. Stay 2 ½ times the height of the falling tree away. More is better.
- ◆ Stay visible; tie bright flagging to your tool. Think of what the operator can see. Can he/she see you?
- ◆ For night operations have a strobe light attached to your pack, or at least a glow stick and headlamp. *The NKRD dozer operator has purchased lights specifically for your use in these situations. These lights are also useful during day time operations when conditions are very smoky.*
- ◆ Never stand or work down slope from a working dozer.
- ◆ Wear ear and eye protection and a hardhat around equipment.
- ◆ Avoid tunnel vision when surveying ahead of dozers. Stop and look around from time to time. Maintain situation awareness.

As a general rule, because of safety concerns, the Kaibab does not encourage archaeologists to work with heavy equipment at night. Instead, it is recommended that the archaeologist brief the dozer boss and/or swamper and operator at the end of the shift regarding any archaeological concerns. A survey of the line that was constructed during the night operations can be completed the following day if the area is safe for entry.

Other Fire line Safety Concerns

It is important for all archaeologists to be familiar with the *10 Standard Firefighting Orders and 18 Watch Out Situations*, know their LCES and be continually mindful of their situational awareness while on the fire line. **Therefore all Archaeologists should carry a copy of the Incident Response Pocket Guide (IRPG) in their field packs.** They should also continually ask themselves the following questions:

- ◆ Safety Zones: Where are they, are they large enough, can I get to them, how long will it take?
- ◆ Escape routes: Are they identified, are there enough of them?
- ◆ Building fire line downhill with fire below (Watch Out No 9).
- ◆ Going indirect with unburned fuel between you and the fire (Watch Out No. 11).
- ◆ Terrain and fuels make escape to safety zones difficult (Watch Out No. 17).
- ◆ Other considerations:
- ◆ Do I have good communications with someone who can see the fire?
- ◆ What is the weather doing? Are there wind shifts, is it getting hotter and drier?
- ◆ What are the fuels like: flashy, dry? What is the terrain like: steep, canyons?
- ◆ Have I been briefed on weather, tactics, hazards, area resources, command?

Situational Awareness Examples

- ◆ Weather change, wind shifts, drying trends, thunderstorms, thermal belts, or lifting inversions are occurring.
- ◆ There is active fire in the area. Where is the fire? What is it doing (behavior, fuels, and rate of spread)?

- ◆ Are there tree felling activities underway, or dead trees and snag hazards present?
- ◆ Where are vehicles and other equipment operating (narrow roads and limited visibility)?
- ◆ Air operations: sling loads, bucket drops, and tankers are operating.
- ◆ Firing operations: backfires and burnouts are underway.
- ◆ Where are designated escape routes and safety zones?

Note of Caution: Archaeologists are trained to look down at the ground. While this is necessary to locate sites, be aware of your surroundings at all times. Dozers knock down trees and vegetation, so it is very important that you keep abreast of what is going on around you and above you. Work closely with the dozer boss. They have specialized training and experience. Follow their instructions.

When you finish surveying/clearing the dozer line or other fire archaeology duties and the fire personnel no longer need you, let the IC know and they may release you from the fire (DO NOT just leave when you think you are finished. You MUST ask the IC if you are no longer needed). When the IC releases you from the fire call dispatch and let them know you're leaving the fire. When you arrive back at the district office/work station call dispatch and let them know you have arrived. If you are going off duty call dispatch and let them know you are out of service.

Locating and Documenting Archaeological Sites

Ideally, there will be someone in the North Kaibab Office that can pull records and send topographic maps out to the field. However, field maps may not be available until after the fire lines are constructed. This is a very common scenario. Archaeologists frequently have to rely on their site identification skills and review maps and records following the fire. This is particularly common on small fires. As soon as feasible, topographic maps showing known site locations, as well as site forms and or descriptions will be provided to assist you in the field. *The District HR program will be obtaining GPS units that store site location data as well as topographic maps. These units will be available for check out from the HR office at the onset of an assignment. It will be required that the units be promptly returned to the HR office once the fire is over.*

Flagging/marking any sites that you identify along the way is helpful in relocating the site after the fire is contained. If possible (and safe), obtaining a GPS location for a site while surveying the line will make it easier to relocate the site later. It is not mandatory that you bring a GPS unit to an active fire, although having a GPS unit is preferable and in some instances necessary. The District archaeologist and/or Resource Advisor will provide you with site data as soon as possible if GPS units and maps are not available at the time you are dispatched.

Once the fire is contained, archaeologists will document any newly located sites as well as prepare damage assessments under the guidance of Connie and Britt. Site documentation is frequently done by the red-carded archaeologist immediately following the fire. Paras cannot independently document sites; however they can assist archaeologists in that task. If sites are discovered during the fire, they will be documented using standard documentation procedures and forms *after the fire is contained*, including getting a GPS site location. The District attempts to GPS all mechanical fire lines when suppression efforts are completed. This data can be used to determine where the line was placed once the data is processed. It can then be used to generate survey maps for the archaeological report that will be compiled post fire.

Once the line is in place, the assigned archaeologist or para should check in with Connie or Britt for further directions on how to proceed.

Appendix L: Job Hazard Analysis

To Be Developed